

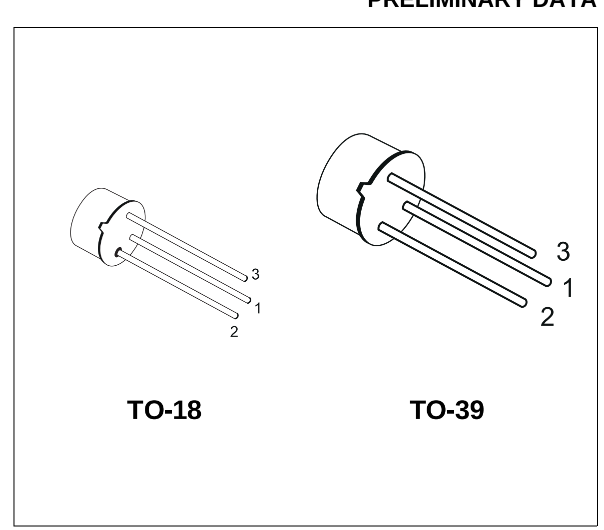
2N2219A
2N2222A

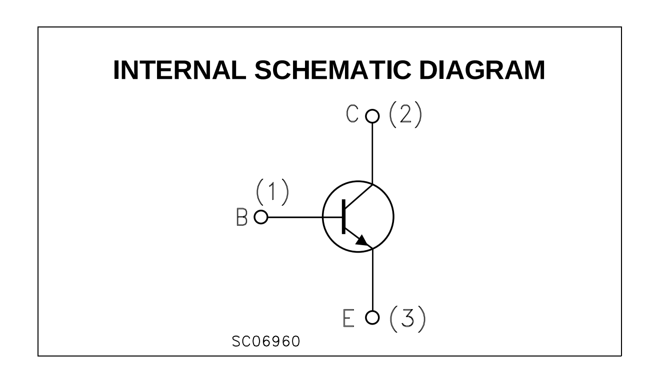
HIGH SPEED SWITCHES

PRELIMINARY DATA

DESCRIPTION

The 2N2219A and 2N2222A are silicon Planar Epitaxial NPN transistors in Jedec TO-39 (for 2N2219A) and in Jedec TO-18 (for 2N2222A) metal case. They are designed for high speed switching application at collector current up to 500mA, and feature useful current gain over a wide range of collector current, low leakage currents and low saturation voltage.





ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage (I_E = 0)	75	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	40	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	6	V
I_C	Collector Current	0.6	A
I_{CM}	Collector Peak Current (t_p < 5 ms)	0.8	A
P_{tot}	Total Dissipation at $T_{amb} \leq 25\ ^oC$ for **2N2219A** for **2N2222A** at $T_C \leq 25\ ^oC$ for **2N2219A** for **2N2222A**	 0.8 0.5 3 1.8	 W W W W
T_{stg}	Storage Temperature	-65 to 175	^oC
T_j	Max. Operating Junction Temperature	175	^oC

THERMAL DATA

		TO-39	TO-18	
$R_{thj-case}$ $R_{thj-amb}$	Thermal Resistance Junction-Case Max Thermal Resistance Junction-Ambient Max	50 187.5	83.3 300	$^oC/W$ $^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current (I_E = 0)	V_{CB} = 60 V V_{CB} = 60 V T_j = 150 ^oC			10 10	nA μA
I_{CEX}	Collector Cut-off Current (V_{BE} = -3V)	V_{CE} = 60 V			10	nA
I_{BEX}	Base Cut-off Current (V_{BE} = -3V)	V_{CE} = 60 V			20	nA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 3 V			10	nA
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage (I_E = 0)	I_C = 10 μA	75			V
$V_{(BR)CEO}$*	Collector-Emitter Breakdown Voltage (I_B = 0)	I_C = 10 mA	40			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage (I_C = 0)	I_E = 10 μA	6			V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 150 mA I_B = 15 mA I_C = 500 mA I_B = 50 mA			0.3 1	V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 150 mA I_B = 15 mA I_C = 500 mA I_B = 50 mA	0.6		1.2 2	V V
h_{FE}*	DC Current Gain	I_C = 0.1 mA V_{CE} = 10 V I_C = 1 mA V_{CE} = 10 V I_C = 10 mA V_{CE} = 10 V I_C = 150 mA V_{CE} = 10 V I_C = 500 mA V_{CE} = 10 V I_C = 150 mA V_{CE} = 1 V I_C = 10 mA V_{CE} = 10 V T_{amb} = -55 ^oC	35 50 75 100 40 50 35		 300	
h_{fe}*	Small Signal Current Gain	I_C = 1 mA V_{CE} = 10 V f = 1KHz I_C = 10 mA V_{CE} = 10 V f = 1KHz	50 75		300 375	
f_T	Transition Frequency	I_C = 20 mA V_{CE} = 20 V f = 100 MHz		300		MHz
C_{EBO}	Emitter-Base Capacitance	I_C = 0 V_{EB} = 0.5 V f = 100KHz			25	pF
C_{CBO}	Collector-Base Capacitance	I_E = 0 V_{CB} = 10 V f = 100 KHz			8	pF
$R_{e(hie)}$	Real Part of Input Impedance	I_C = 20 mA V_{CE} = 20 V f = 300MHz			60	Ω

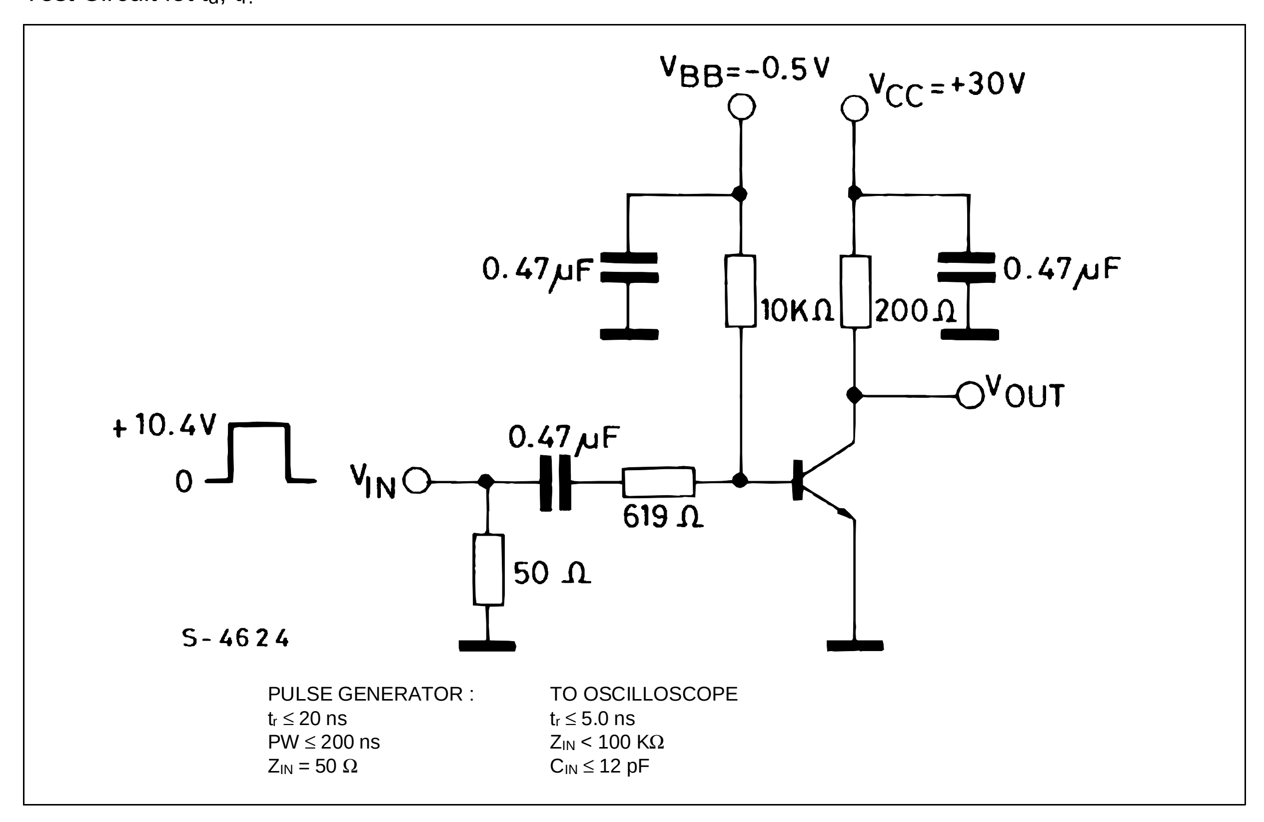
* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %

ELECTRICAL CHARACTERISTICS (continued)

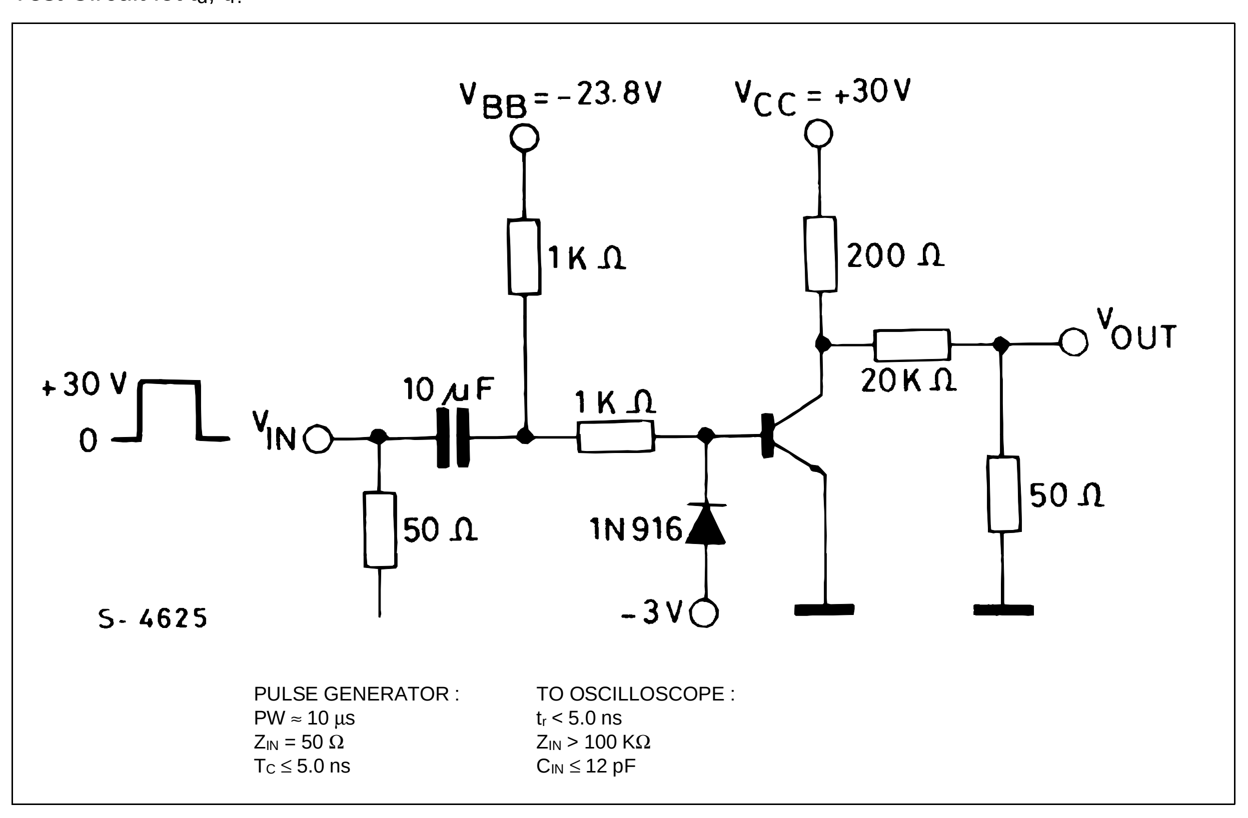
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
NF	Noise Figure	I_C = 0.1 mA V_{CE} = 10 V f = 1KHz R_g = 1KΩ		4		dB
h_{ie}	Input Impedance	I_C = 1 mA V_{CE} = 10 V I_C = 10 mA V_{CE} = 10 V	2 0.25		8 1.25	kΩ kΩ
h_{re}	Reverse Voltage Ratio	I_C = 1 mA V_{CE} = 10 V I_C = 10 mA V_{CE} = 10 V			8 4	10^{-4} 10^{-4}
h_{oe}	Output Admittance	I_C = 1 mA V_{CE} = 10 V I_C = 10 mA V_{CE} = 10 V	5 25		35 200	μS μS
t_d**	Delay Time	V_{CC} = 30 V I_C = 150 mA I_{B1} = 15 mA V_{BB} = -0.5 V			10	ns
t_r**	Rise Time	V_{CC} = 30 V I_C = 150 mA I_{B1} = 15 mA V_{BB} = -0.5 V			25	ns
t_s**	Storage Time	V_{CC} = 30 V I_C = 150 mA I_{B1} = -I_{B2} = 15 mA			225	ns
t_f**	Fall Time	V_{CC} = 30 V I_C = 150 mA I_{B1} = -I_{B2} = 15 mA			60	ns
$r_{bb'}$ $C_{b'c}$	Feedback Time Constant	I_C = 20 mA V_{CE} = 20 V f = 31.8MHz			150	ps

∗ Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %
∗∗ See test circuit

Test Circuit fot t_d, t_r.

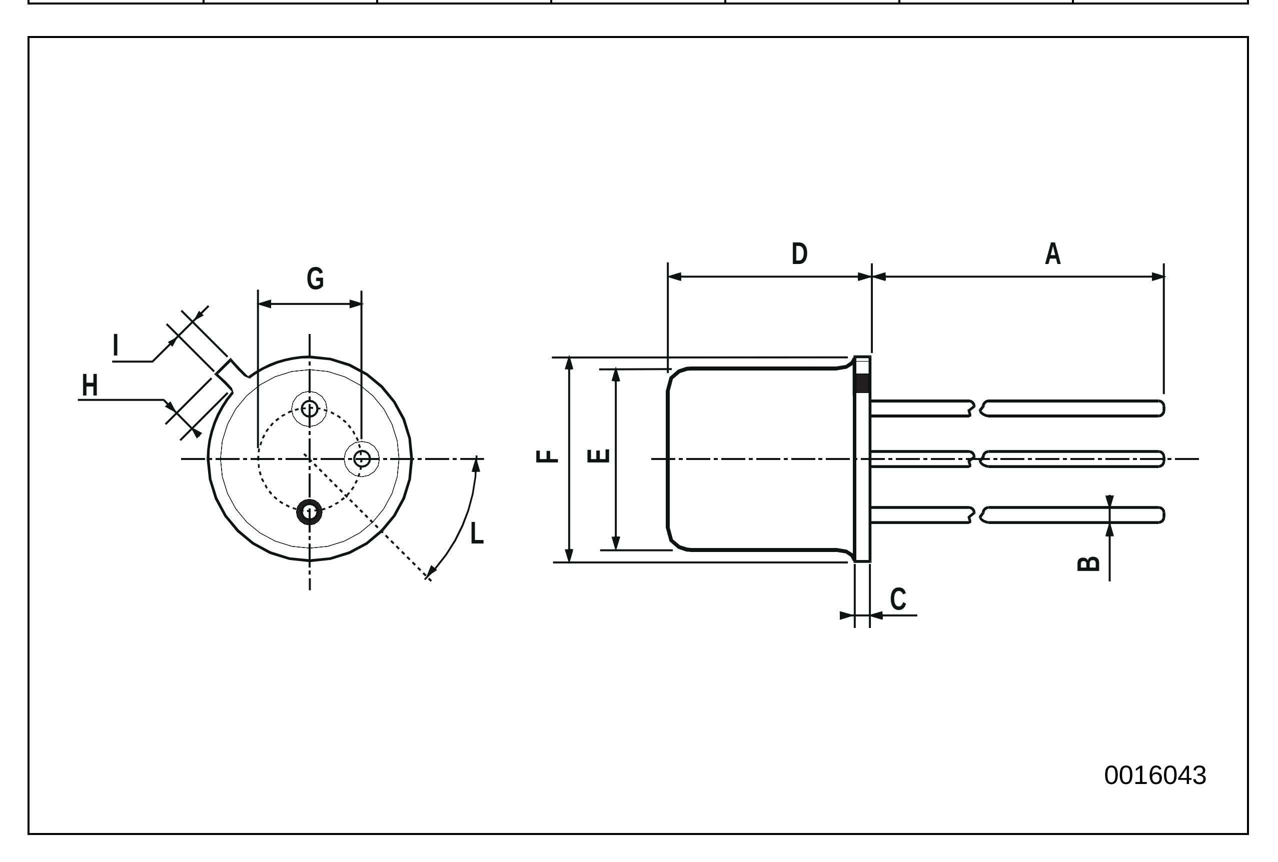


Test Circuit fot t_d, t_r.



TO-18 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45^{o}			45^{o}		



TO-39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45^{o} (typ.)					

